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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/759,402	01/12/2001	George Cybenko	389522	1647

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EXAMINER

MOORTHY, ARAVIND K

ART UNIT PAPER NUMBER

2131

DATE MAILED: 05/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/759,402

Applicant(s)

CYBENKO, GEORGE

Examiner

Aravind K. Moorthy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This is in response to the amendment filed on 18 January 2005.
2. Claims 1-16 are pending in the application.
3. Claims 1-16 have been rejected.

Response to Arguments

4. Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5. **Claims 1-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Grover U.S. Patent No. 6,317,766 B1.**

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As to claims 1 and 15, Grover discloses a method for encrypting programs for encrypted execution on a network having a remote host computer, comprising the steps of:

encoding a program as a unitary matrix with n rows and n columns
[column 3, lines 5-14];

encoding an input data string to the program as a vector of length n , wherein execution of the program on the input data string is realized by matrix multiplication of the unitary matrix with the vector [column 3, lines 16-19];

loading the encoded program and the encoded data string on the host computer [column 3, lines 38-53];

executing the encoded program, using the encoded data string, on the host computer [column 3, lines 38-53];

communicating results from the host computer to the network
[column 3, lines 38-53]; and

decoding the results into output representative of executing the program with the data string, wherein computations and data associated with the program and data string are unintelligible and useless at the host computer [column 4, lines 30-63].

As to claim 2, Grover discloses that the step of encoding a program comprises converting the program to a unitary matrix multiplication [column 8 line 58 to column 9 line 18].

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As to claim 3, Grover discloses that the step of converting the program comprises converting the program to a unitary matrix multiplication U such that $U \in U_n$ for some integer n , where U_n represents a group of unitary matrices of size n [column 8 line 58 to column 9 line 18].

As to claim 4, Grover discloses that the step of encoding the program comprises generating two independent identically distributed unitary matrices X , Y from the uniform probability distribution over U_n determined by the Haar distribution [column 8 line 58 to column 9 line 18].

As to claim 5, Grover discloses that the step of encoding a program comprises the steps of computing U' as XUY^* and communicating U' to the remote host computer over the network [column 9, lines 14-19].

As to claim 6, Grover discloses that the step of encoding the input data string comprises converting the input data string to a vector b [column 9, lines 14-19].

As to claim 7, Grover discloses that the step of encoding comprises the steps of computing b' as Yb and communicating b' to the remote host over the network [column 11, lines 16-53].

As to claim 8, Grover discloses that the step of executing the encoded program, using the encoded data string, on the host computer comprises the steps of computing the product of XUY^* and Yb and communicating results to the network [column 12 line 51 to column 13 line 22].

As to claim 9, Grover discloses that the step of decoding the results into output comprises computing X^*XUb , external of the host computer, to determine the multiplication of Ub as desired output of the programs wherein XUY^* and Yb is (XUb)

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and $X \cdot X_{Ub}$ is obtained by matrix multiplication $X \cdot (X_{Ub})$ [column 12 line 51 to column 13 line 22].

As to claim 10, Grover discloses the step of decoding comprises decrypting at a control computer connected to the network and the host computer [column 3, lines 38-53].

As to claim 11, Grover suggests that the network comprises the Internet [column 3, lines 38-53].

As to claim 12, Grover suggests that the network comprises a virtual private network [column 3, lines 38-53].

As to claim 13, Grover suggests that the network comprises a local area network (LAN) [column 3, lines 38-53].

As to claim 14, Grover discloses embedding one or more constants into the input data string or program, prior to encoding, to detect incorrect execution or data tampering [column 13, lines 22-47].

As to claim 16, Grover discloses that the control computer embeds one or more constants into the unitary matrix or data string, wherein the results from the host computer indicate tampering or incorrect execution of the encoded program [column 8 line 58 to column 9 line 18].


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Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aravind K. Moorthy whose telephone number is 571-272-3793. The examiner can normally be reached on Monday-Friday, 8:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ayaz R. Sheikh can be reached on 571-272-3795. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Aravind K Moorthy 
April 26, 2005


AYAZ SHEIKH
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